PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/678,905

Filing Date: October 3, 2003

Applicant: Doh et al.

Group Art: 3742

Examiner: Shawntina T. Fuqua

Title: AIRCRAFT FLIGHT DECK/CABIN MICROWAVE HUMIDIFIER

Attorney Docket: 7784-000657

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF
UNDER 37 C.F.R. § 41.37

Dear Sir or Madam:

This appeal brief is in support of an appeal taken from the February 24, 2005 final rejection of Claims 1, 3 – 6, 9 – 15, 17 – 21, and 23 – 28. The Notice of Appeal was filed June 24, 2005.

REAL PARTY IN INTEREST – UNDER 37 C.F.R. § 41.37(c)(1)(i)

The Boeing Company, being the assignee of the present application, is the real party in interest.

RELATED APPEALS & INTERFERENCES - UNDER 37 C.F.R. § 41.37(c)(1)(ii)

To the best of Appellants' knowledge, no other appeals or interferences are pending which will directly affect, be directly affected by or have a bearing on the Board's decision in the present pending appeal.

RELATED ISSUED PATENT

To the best of Appellants' knowledge, no other patent applications have been filed which will directly affect, be directly affected by or have a bearing on the Board's decision in the present pending appeal.

STATUS OF THE CLAIMS – UNDER 37 C.F.R. § 41.37(c)(1)(iii)

On June 24, 2005, Appellants appealed from the final rejection of Claims 1, 3 – 6, 9 – 15, 17 – 21, and 23 – 28.

- A copy of the claims presently being appealed (i.e., Claims 1, 3 – 6, 9 – 15, 17 – 21, and 23 – 28) is provided in the attached Claims Appendix.
- A copy of the Office Action mailed February 24, 2005 placing the present application under final rejection is provided in the attached Evidence appendix.

STATUS OF AMENDMENTS – UNDER 37 C.F.R. § 41.37(c)(1)(iv)

No amendment to the claims has been filed or is pending subsequent to the entry of the final rejection.

SUMMARY OF THE CLAIMED SUBJECT MATTER – UNDER 37 C.F.R. § 41.37(c)(1)(v)

In accordance with 37 C.F.R. § 41.37(c)(1)(v), the following is a concise explanation of the subject matter defined in each of the independent claims (i.e., Claims 1 and 15). None of the claims are drafted as permitted by 35 U.S.C. § 112 ¶ 6 and, as such, no further explanation pursuant to 37 C.F.R. § 41.37(c)(1)(v) is included.

The present invention relates to humidification systems, and more particularly to a humidification system and method which removes micro-organisms and mineral deposits from water being used in the system to provide even cleaner humidified air within a confined area. *(Application, Page 1, Lines 4 – 7)*

Referring to Figure 1, there is shown a humidification system 10 in accordance with a preferred embodiment of the present invention. The humidification system 10 can be used within fixed structures to provide an especially clean, mineral and micro-organism free, humidified airflow within a confined area, such as a room, of the structure, or alternatively it can be used within a mobile platform such as an aircraft, bus, train, ship or other moving structure. While the following description will describe the system 10 as being used with an aircraft, it will be appreciated that the system can be employed in a

variety of applications and is therefore not limited to only those involving aircraft. *(Application, Page 4, Lines 6 – 14)*

The system generally includes a vessel 12 for containing a predetermined quantity of water therein, a microwave oven 14 within which the vessel is disposed for heating the water within the vessel 12, and a controller 16 for controlling operation of the system 10. The controller 16 controls the admittance of fresh water into the vessel 12 through a water supply conduit 18 by controllably opening and closing a valve 20 disposed in the water supply conduit. The water flowing through the water supply conduit 18 is supplied from a suitable potable water reservoir 22. A water level sensor 23 monitored by the controller 16 is used to monitor the level of water within the vessel 12 during a fill cycle when the vessel 12 is filled. The water supply conduit 18 has an output end 24 through which water may be drained or pumped into the vessel 12 to fill the vessel. The vessel 12 may be a ceramic vessel or may be made from any suitable material that is able to withstand repeated heating and cooling cycles. *(Application, Page 4, Lines 15 – 27)*

The system 10 further includes a steam or vapor outflow conduit 26 which is in communication with an upper end 12a of the vessel 12 to receive steam generated as the water is heated within the vessel 12. A pressure regulator valve 25 is disposed within the outflow conduit 26 and controlled by the controller 16. The vapor flows through the conduit 26, through the pressure regulator valve 25 and into air flowing through an airflow conduit 28. The water vapor is

intermixed with the airflow and eventually is directed into a cabin area of an aircraft 30. *(Application, Page 4, Line 28 – Page 5, Line 2)*

The system 10 further preferably comprises a water overflow, pressure relief conduit 32 which is also in communication with the vessel 12. A pressure regulator valve 34 controlled by controller 16 is disposed in the overflow/pressure relief conduit 32, and is selected such that it opens when a predetermined over pressure is reached in the conduit 32 or an overflow condition occurs in the conduit 32. The controller is also able to control this valve in the event of any condition wherein immediate opening or closing of this valve is required. Sensing of a fluid overflow condition is accomplished by a sensor 32a placed adjacent to the level of an overflow port 32b in the vessel that communicates with conduit 32. Thus, if the pressure within the vessel 12 exceeds a predetermined upper limit, then pressure within the vessel 12 may be alleviated by the overflow/pressure relief valve 34 opening and draining a subquantity of water from the vessel 12. Similar logic is used for sensing an overflow condition of vessel 12. *(Application, Page 5, Lines 3 – 16)*

The system 10 further includes a drain or outflow conduit 36 which is in communication with a lower end 37 of the vessel 12. The drain conduit 36 includes a valve 38 disposed therein which is controlled by the controller 16. When the drain valve 38 is opened, water within the vessel 12 may be drained through the conduit 36 and a fresh quantity of water admitted into the vessel 12. *(Application, Page 5, Lines 17 – 22)*

Referring further to Figure 1, an optional vacuum accumulator 40 is included for assisting in the draining of water from the vessel 12. The vacuum accumulator 40 includes an input 42 which is in communication with an outlet end 44 of the drain conduit 36. The vacuum accumulator 40 further includes an outflow port 46 which is coupled to a drain mast 48 of the aircraft 30. An output port 50 of the drain mast 48 is in communication with the ambient environment outside the aircraft 30. The drain mast 48 includes a one way, vacuum actuated pressure relief valve 52 disposed therein. While the vacuum accumulator 40 forms an especially convenient means for assisting and emptying the contents of the vessel 12, it will be appreciated that the system 10 could readily be employed without it. For example, portion 44 of drain conduit 36 could be coupled directly to the drain mast 50 to allow draining of fluid from the vessel 12 directly into the drain mast 48. However, the use of the vacuum accumulator guarantees a vacuum source will be present even when aerodynamic conditions surrounding the drain mast 48 output port 50 do not provide favorable vacuum conditions when the vessel 12 is commanded to drain the water and minerals from the vessel 12. *(Application, Page 5, Line 23 – Page 6, Line 6)*

The microwave oven has a power rating of preferably between about 250 watts – 1000 watts although it will be appreciated that a microwave oven having a power rating outside this range could readily be employed. The principal factor in determining the power required for the microwave is the amount of water that needs to be heated within a given time. Assuming the vessel 12 has the capacity to hold one quart (0.95 liter) of water, and further assuming that the temperature

of water supplied from the reservoir 22 into the vessel 12 is approximately 50°F (10°C), then an oven having a power rating of preferably at least about 1000 watts will be preferred to bring the water to the boiling point within about fifteen minutes. Suitable microwave ovens are available from various companies such as Panasonic and Sanyo. Furthermore, any suitable type of heating system/device could be implemented, provided same is able to heat the water in the vessel rapidly to the boiling point, such as for example radar energy. As such, it will be appreciated that the present invention is not limited to use with only a microwave oven. However, the use of a microwave oven provides the advantage that the water does not need to contact any heating element, and this reduces the possibility of any buildup of minerals on the heating component of the system, which many previously developed systems are susceptible to. *(Application, Page 6, Lines 7 – 25)*

With further reference to Figure 1, the controller 16 may optionally monitor an output from a humidity sensor 54 disposed within the airflow conduit 28. If the humidity sensor 54 is employed, then a "closed loop" humidity sensing system may be formed with the controller monitoring the real time humidity of the airflow 28 and controlling valves 20 and 38 to adjust the admittance and draining of water, respectively, so as to maintain the humidity of the airflow 28 within a given predetermined range. *(Application, Page 6, Lines 26 – 32)*

With further reference to Figures 1 and 2, an injection nozzle 56 can optionally be employed to help better disburse the steam exiting through the vapor conduit 26. The injection nozzle 56 is disposed generally longitudinally in

line with the airflow flowing through the conduit 28 and includes a plurality of vanes 58. The vanes 58 are arranged in a circumferential pattern (Figure 2) to extend from a tubular member 60 and are further arranged such that they are disposed at preferably about a 15°-20° angle of attack relative to the direction of flow of the air flowing within the conduit 28. The tubular member 60 is fixedly coupled to the vapor outflow conduit 26 and includes a plurality of openings 61 therein. The steam exiting from the vapor outflow conduit 26 flows through the openings 61 and into the airflow conduit 28 and forms steam jets 63. The air flowing in the airflow conduit 28 encounters the staggered steam jets 63 exiting through the openings 61 and begins to intermix therewith. Further mixing of the steam jets 63 and the air flowing in the conduit occurs as a result of the swirling action imparted to the air/stream jet mixture by the vanes 58. Essentially, the vanes 58 help to create a swirling, turbulent, air/stream flow that causes thorough intermixing of the air and steam jets 63. *(Application, Page 7, Lines 1 – 17)*

Turning now to the operation of the system 10, initially the controller 16 opens valve 20 to admit a predetermined quantity of water into the vessel 12 from the water reservoir 22 through water inflow conduit 18. The water flows through output end 24 of the conduit 18 and fills the vessel 12 until water level sensor 23 signals to controller 16 that the water has reached a predetermined upper level within the vessel 12. At this point the controller 16 closes valve 20 to interrupt the flow of water through the water supply conduit 18. It will also be appreciated that while the vessel 12 is filling, the controller 16 maintains valve 38 in a closed position. *(Application, Page 6, Lines 18 – 26)*

The controller 16 then causes the microwave oven 14 to be turned on to begin heating the water within the vessel 12. The microwave oven 14 heats the vessel 12 for a time sufficient to allow the water to come to a boil. This in turn generates mineral/micro-organism free steam within the vessel 12 which rises through the vapor outflow conduit 26. At this point the controller 16 turns off the microwave oven 14 for a brief period of time as the pressure of the steam is regulated through the valve 25 and through the vapor outflow conduit 26, and flows through the openings 61 in the tubular member 60. The steam jets 63 are dispersed by the injection valve 56, that induces a swirl in the air, and that causes the air to be thoroughly intermixed with the steam jets 63 to form the clean, humidified airflow through the vapor outflow conduit 26. The resulting mixture forms an especially clean, mineral free humidified airflow. The humidified air then flows into the cabin of the aircraft 30. *(Application, Page 7, Line 27 – Page 8, Line 6)*

In a preferred implementation the pressure regulator valve 25 is selected such that remains closed until a predetermined steam pressure is reached that is preferably about 1.0 psi greater than the known pressure in the airflow conduit 28. In this manner, the steam entering the airflow conduit 28 will be slightly super heated. The slightly super heated steam readily mixes with the air flowing in the airflow conduit 28, thus avoiding the need for a large cone or other large rotating structure to ensure thorough mixing. This also avoids the problem with large duct pressure losses in the airflow conduit 28 that can be caused by large

cones or like rotating structures that are typically used to induce a swirl in the airflow. *(Application, Page 8, Lines 7 – 16)*

After a brief predetermined time, the controller 16 shuts down the microwave oven and opens valve 38, thus allowing the water within the vessel 12 to be drained therefrom. The water is drained very rapidly in part by a vacuum supplied by the vacuum accumulator 40. This rapid evacuation of water from the vessel 12 helps to drain minerals in the water and prevent the buildup of such minerals within the vessel 12. As will be appreciated, the boiling of the water within the vessel 12 produces a generally micro-organism free vapor which allows a humidified airstream to be generated which is also substantially free of micro-organisms. *(Application, Page 8, Lines 17 – 25)*

If the vacuum accumulator 40 is incorporated into the system 10, then the draining of water from the vessel 12 is accomplished especially rapidly. The vacuum accumulator, in one preferred form, comprises a metal canister, although it will be appreciated that other materials could be used just as well provided same are structurally rigid and can withstand the drop in pressure as a result of the vacuum generated. *(Application, Page 8, Lines 26 – 31)*

As the aircraft operates, its relatively high speed of movement causes a drop in pressure at the outlet port 50 of the drain mast 48. This drop in pressure causes pressure relief valve 52 to open and air within the vacuum accumulator 40 is drawn out therefrom. Eventually the pressure on both sides of the pressure relief valve 52 will equalize and the valve will close. When the controller 16 determines that water needs to be drained from the vessel 12, it opens valve 38.

The pressure of the steam (i.e., vapor) generated within the vessel 12 helps to push the water out of the vessel 12 into the drain conduit 36 and through the open valve 38 into the vacuum accumulator 40. At the moment valve 38 is opened by controller 16, the low pressure area formed within the vacuum accumulator 40 assists in rapidly draining water out through the drain conduit 36, through the vacuum accumulator 40, through the drain mast 48 and out into the ambient environment. To begin a subsequent cycle, the controller then closes valve 38 and opens valve 20 to admit a fresh quantity of water from the water reservoir 22 into the vessel 12, and the above-described cycle is repeated. If humidity sensor 54 is employed, the controller 16 monitors this sensor and adjusts the above-described cycle accordingly through the control of valves 20 and 38 such that the humidity of the air flowing through the airflow conduit 28 is maintained within a predetermined range. *(Application, Page 8, Line 32 – Page 9, Line 17)*

While the vacuum accumulator 40 forms an especially convenient means for ensuring that the water is drained quickly out of the vessel 12 after a heating cycle is completed, if the vacuum being experienced by the drain mast 48 is not sufficient to provide the intended vacuum, then the water drained from the vessel 12 will be temporarily stored within the accumulator 40. The use of the vacuum accumulator 40 eliminates some of the drawbacks with previous humidification systems employed in aircraft where the vacuum experienced by the drain mast 40 is not always sufficient to assist in the draining process. Such conditions can occur, for example, when the aircraft is in a descent or a turn. During these

conditions, there may not be a sufficient vacuum created on the drain mast 48 to assist in quickly draining water from the vessel 12. As a result, water may not be drained sufficiently quickly to permit the initiation of a new heating cycle. The vacuum accumulator 40, however, itself forms a temporary fluid reservoir for those times when the aircraft may be in a phase of flight where sufficient vacuum is not present at the drain mast 48 to permit rapid draining of the water from the vessel 12. *(Application, Page 9, Lines 18 – 33)*

The use of a microwave oven to boil the water provides a micro-organism free, humidified airflow into the cabin area of the aircraft 30. This further serves to reduce maintenance and help to prevent the growth/transmittal of micro-organisms within various components of the system 10. These factors serve to significantly reduce maintenance costs when operating system 10. *(Application, Page 10, Lines 1 – 5)*

The present invention further effectively eliminates minerals from the steam that is generated from the water in the vessel. Previously developed systems that make use of an evaporating sponge or atomization process allow the minerals to enter the airstream in the airflow duct. These minerals can collect and form a white powder in the duct, and be transmitted as white dust into the air of a flight deck or cabin area when an aircraft makes a hard landing. With the steam-based system 10 of the present invention, the minerals are left in the water in the boiler, rather than being transported via the steam into the air stream flowing in the flight deck or cabin. *(Application, Page 10, Lines 10 – 18)*

Furthermore, the system 10 helps to reduce pressure losses in the ducting used within the aircraft which can help to reduce the back pressure on an air-conditioning system employed during normal operation of the aircraft. The use of a micro-organism free humidification system significantly improves the comfort of the environment within the cabin of the aircraft as well as helping to provide cleaner air for the occupants to breathe. *(Application, Page 10, Lines 19 – 24)*

GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL – UNDER 37 C.F.R. § 41.37(c)(1)(vi)

Appellants present the following issue for review:

Whether or not Claims 1, 3 – 6, 9 – 15, 17 – 21, and 23 – 28 are unpatentable under 35 U.S.C. §112, first paragraph, as claiming new matter not disclosed in the application as originally filed, and accordingly, whether the December 2, 2004 Amendment filed by Appellants adds new matter as prohibited by 35 U.S.C. §132.

ARGUMENT – UNDER 37 C.F.R. § 41.37(c)(1)(vii)

Pursuant to 37 C.F.R. § 41.37(c)(1)(vii), the following provides the contentions of appellants with respect to the sole ground of rejection above presented for review in accordance with 37 C.F.R. § 41.37(c)(1)(vi). In accordance with 37 C.F.R. § 41.37(c)(1)(vii), claims argued separately and/or in a group are placed under an appropriate subheading to identify the claim(s) by number.

Claims 1, 3 – 6, 9 – 15, 17 – 21, and 23 – 28

It is initially contended that Appellants have identified support within the specification as originally filed for the claim amendments made in the December 2, 2004 Amendment. The fact that the word "entire" is not explicitly stated in the description of the draining process does not mean that this is not the clear and unmistakable intent of the specification. As the MPEP plainly states:

> To comply with the written description requirement of 35 U.S.C. 112, para. 1, or to be entitled to an earlier priority date or filing date under 35 U.S.C. 119, 120, or 365(c), each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure. (MPEP §2163(II)(A)(3)(a)(ii)(b)).)

One skilled in the art would unmistakably understand that the originally filed application implicitly contemplates evacuating the entire quantity of water contained within the vessel. It is therefore respectfully submitted that the originally filed specification complies with the written description requirements of 25 U.S.C. 112 and, there being no other rejections, Appellants are entitled to allowance of the present application.

I. If the Essence of the Original Disclosure Supports the New Limitation, the New Limitation is not New Matter

The test for claim support under the first paragraph of §112 is whether the disclosure as originally filed reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter, rather than the presence or absence of literal support. *Ralston-Purina Co. v. Farm-Mar-Co, Inc.*, 772 F. 2d 1570, 227 USPQ 177 (Fed. Cir. 1985); *In re Kaslow*, 707 F. 2d 1366, 217 USPQ 1089 (Fed. Cir. 1983). The specification need not explicitly state

each and every limitation of the claims; if the essence of the original disclosure supports the new claim limitation, the new limitation is not new matter. *In re Wright*, 866 F. 2d 422, 9 USPQ2d 1649, 1651 (Fed. Cir. 1989).

II. The Essence of the Original Disclosure Supports Draining the "Entire" Quantity of Water

The originally filed specification implicitly supports the limitation of draining the "entire" amount of water from the vessel. The clear meaning of the description of the draining operation is that the entire quantity of water is emptied from the vessel, despite the fact that the word "entire" is not specifically used. Additionally, the specification repeatedly refers to the objective of providing mineral- and microorganism-free water vapor. One skilled in the art would clearly understand that this requires draining the entire quantity of water from the vessel after heating. Further, the use of a vacuum accumulator to drain the vessel teaches emptying the entire quantity of water from the vessel, as the vacuum accumulator increases the draining power significantly, such that draining occurs very quickly. As such, it is respectfully submitted that the originally filed specification implicitly supports the limitation of draining the "entire" quantity of water from the vessel.

a. The Clear Meaning of the Description of the Draining Operation is that the "Entire" Quantity of Water is Drained from the Vessel

The clear import of the specification is that the entire quantity of water is emptied from the vessel. Throughout the specification, including the specific examples provided below, the word "drain" can be found to describe the action of

removing water from the vessel. This word is commonly understood as referring to completely emptying or exhausting a container. The fact that the word "entire" is not used in the specification to describe the draining of the vessel after the heating cycle, exactly as it appears in Claims 1 and 15, does not alter the clear meaning of the specification.

This meaning can be found throughout the specification. For example, at Page 5, lines 17 – 22:

> *"The system 10 further includes a drain or outflow conduit 36 which is in communication with a lower end 37 of the vessel 12. The drain conduit 36 includes a valve 38 disposed therein which is controlled by the controller 16. When the drain valve 38 is opened, water within the vessel 12 may be drained through the conduit 36 and a fresh quantity of water admitted into the vessel 12."*

The clear meaning of this paragraph is that all of the water is drained, with a new quantity of water coming into the vessel afterwards to begin a new heating cycle.

As another example, refer to Page 8, lines 17 – 25:

> *"After a brief predetermined time, the controller 16 shuts down the microwave oven and opens valve 38, thus allowing the water within the vessel 12 to be drained therefrom. The water is drained very rapidly in part by a vacuum supplied by the vacuum accumulator 40. This rapid evacuation of water from the vessel 12 helps to drain minerals in the water and prevent the buildup of such minerals within the vessel 12. As will be appreciated, the boiling of the water within the vessel 12 produces a generally micro-organism free vapor which allows a humidified airstream to be generated which is also substantially free of micro-organisms."* (emphasis supplied)

This paragraph uses the words or phrases "*drained*," "*drained very rapidly*," and "*rapid evacuation*" to describe the removal of the quantity of water from the vessel. Again, the clear meaning of these phrases is to emphasize that the

entire quantity of heated water is removed from the vessel after the heating cycle is completed.

Refer also to Page 9, lines 18 – 33:

> *"While the vacuum accumulator 40 forms an especially convenient means for ensuring that the water is drained quickly out of the vessel 12 after a heating cycle is completed, if the vacuum being experienced by the drain mast 48 is not sufficient to provide the intended vacuum, then the water drained from the vessel 12 will be temporarily stored within the accumulator 40. The use of the vacuum accumulator 40 eliminates some of the drawbacks with previous humidification systems employed in aircraft where the vacuum experienced by the drain mast 40 is not always sufficient to assist in the draining process... During these conditions, there may not be a sufficient vacuum created on the drain mast 48 to assist in quickly draining water from the vessel 12. As a result, water may not be drained sufficiently quickly to permit the initiation of a new heating cycle. The vacuum accumulator 40, however, itself forms a temporary fluid reservoir for those times when the aircraft may be in a phase of flight where sufficient vacuum is not present at the drain mast 48 to permit rapid draining of the water from the vessel 12."* (emphasis supplied)

Appellants fail to see how any reasonable meaning, other than draining the entire quantity of water from the vessel, can be gleaned from this paragraph, which emphasizes the use of a vacuum accumulator to assist in even more quickly and efficiently removing the water from the vessel so that a new heating cycle can begin.

b. The Stated Objective of Providing Mineral-Free Humidificaiton System Requires Draining the Entire Quantity of Water

The specification makes repeated references to the need for supplying a mineral and microorganism-free water vapor stream. As stated at page 1, lines 4 – 7: *"The present invention relates to... a humidification system and method*

which removes micro-organisms and mineral deposits from water being used in the system to provide even cleaner humidified air within a confined area." At page 8, lines 20 – 22: *"Th[e] rapid evacuation of water from the vessel 12 helps to drain minerals in the water and prevent the buildup of such minerals within the vessel 12."* Additionally, at page 10, lines 1 – 5: *"The use of a microwave oven to boil the water provides a micro-organism free, humidified airflow into the cabin area of the aircraft 30. This further serves to reduce maintenance and help to prevent the growth/transmittal of micro-organisms within various components of the system 10. These factors serve to significantly reduce maintenance costs when operating system 10."*

The invention provides this feature in part by draining the entire quantity of water from the vessel after the heating cycle is completed. One skilled in the art would easily recognize that evacuating the entire quantity of water is required to fulfill this stated objective. Any water left in the vessel from a previous cycle would most certainly promote the accumulation of undesirable minerals and microorganisms, thus completely vitiating one of the clearly stated (and central) objectives of the invention. The inescapable conclusion is that the clear meaning and intent of the specification is that the entire quantity of water is drained from the vessel after each heating cycle.

c. Use of Vacuum Accumulator in One Embodiment Suggests that Complete Draining is Necessary

It is next submitted that the use of a vacuum accumulator in one embodiment of the invention which is described in the specification implies that the entire quantity of water is drained from the vessel quickly after the heating

cycle is completed. The vacuum accumulator is mentioned in several places in the specification. Referring, for example, to Page 5, line 23 – Page 6, line 6:

> *"...[A]n optional vacuum accumulator 40 is included for assisting in the draining of water from the vessel 12. While the vacuum accumulator 40 forms an especially convenient means for assisting and emptying the contents of the vessel 12, it will be appreciated that the system 10 could readily be employed without it. For example, portion 44 of drain conduit 36 could be coupled directly to the drain mast 50 to allow draining of fluid from the vessel 12 directly into the drain mast 48. However, the use of the vacuum accumulator guarantees a vacuum source will be present even when aerodynamic conditions surrounding the drain mast 48 output port 50 do not provide favorable vacuum conditions when the vessel 12 is commanded to drain the water and minerals from the vessel 12."* (emphasis supplied)

The vacuum accumulator assists in evacuating the water from the vessel by providing a constantly available vacuum pressure to act upon the water within the vessel. The water can thus be drained even more quickly, so that fresh water may then be introduced into the vessel, allowing the next heating cycle to begin. Using such a significant vacuum force to drain the vessel essentially guarantees that the entire contents of the vessel will be emptied almost instantaneously- it is difficult to envision only partially draining the vessel with such a system. The suggestion of a vacuum accumulator in one embodiment of the invention therefore implies that the entire quantity of water is removed before the fresh quantity of water is introduced into the vessel.

CONCLUSION

Appellant respectfully submits that the claim amendments of the December 2004 Amendment that reference draining an "entire quantity" of water from the vessel are clearly supported in the specification as originally filed and, thus, do not constitute new matter. It is submitted that a reasonable reading and interpretation of the specification could lead to no other conclusion. In actual practice, the Examiner's conclusion that the entire quantity of water is not drained from the vessel would essentially vitiate one of the most important and central objectives of the invention, that being providing microorganism-free humidified air. Accordingly, reversal of the rejection of Claims 1 through 20, and allowance of the application are respectfully requested.

Respectfully submitted,

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Claims Appendix
UNDER 37 C.F.R. § 41.37(c)(1)(viii)

1. (Previously Amended) A humidification system for providing substantially micro-organism free water vapor into an airflow conduit flowing a quantity of air therethrough, said system comprising:

a vessel for containing a quantity of water, wherein the water contains micro-organisms, said vessel including an inlet valve for admitting water into said vessel;

an oven for containing said vessel and heating said water to a temperature, and for a duration, sufficient to at least substantially remove said micro-organisms and to generate a substantially micro-organism free steam;

a vapor outlet conduit for channeling said substantially micro-organism free steam into said airflow conduit to humidify said air flowing through said airflow conduit; and

a controller for controlling said drain valve and said inlet valve, and for turning on and off said microwave oven, said controller further controlling said drain valve such that an entire quantity of heated water is drained from said vessel before said controller causes said inlet valve to admit a fresh quantity of water into said vessel.

2. (Cancelled)

3. (Original) The system of claim 1, wherein said oven comprises a microwave oven.

4. (Previously Amended) The system of claim 1, further comprising a water drain line in communication with said vessel for allowing said quantity of water to be drained from said vessel, said water drain line housing said drain valve.

5. (Original) The system of claim 4, further comprising a vacuum accumulator in communication with said water drain line for assisting in withdrawing said quantity of water from said vessel through said water drain line, and at least temporarily containing said quantity of water.

6. (Original) The system of claim 1, further comprising a water supply conduit in communication with said vessel for supplying said quantity of water to said vessel.

7. (Cancelled)

8. (Cancelled)

9. (Original) The system of claim 1, further comprising a humidity sensor in communication with the vapor outlet conduit for detecting a level of humidity in said air flowing in said airflow conduit.

10. (Original) The system of claim 1, further comprising a vapor injection nozzle for receiving said substantially micro-organism free steam from said vapor outlet conduit and dispersing same into said air flowing through said airflow conduit.

11. (Original) The system of claim 10, wherein said vapor injection nozzle comprises:

a plurality of vanes, said vanes being subject to said air flowing through said airflow conduit such that said vanes cause said air flowing in said airflow conduit to swirl to thus help in dispersing and intermixing said substantially micro-organism free steam with said air.

12. (Original) The system of claim 1, further comprising a water overflow conduit in communication with said vessel for receiving any of said water contained in said vessel that overflows from said vessel during heating of said water by said oven.

13. (Original) The system of claim 1, wherein said water overflow conduit includes a pressure relief valve for allowing a flow of said water through said water overflow conduit only when a predetermined pressure is reached in said water overflow conduit.

14. (Original) The system of claim 1, further comprising:

a pressure regulating valve disposed in said airflow conduit for regulating a flow of said steam into said airflow conduit and maintaining a pressure of said steam at a pressure present in said airflow conduit.

15. (Previously Amended) A system for humidifying air being supplied within a confined area, said system comprising:

an airflow conduit for providing a flow of air into said confined area;

a vessel for containing a quantity of water, wherein the water contains micro-organisms;

an oven for heating said water in said vessel to a temperature, and for a duration, sufficient to at least substantially remove said micro-organisms and to generate a substantially micro-organism free steam;

a vapor injection system for injecting said substantially micro-organism free steam into said airflow conduit and assisting in mixing said substantially micro-organism free steam with said air flowing through said airflow conduit to humidify said air; and

a controller for draining an entire quantity of heated water within said vessel after a heating cycle before causing a fresh quantity of water to be admitted into said vessel.

16. (Cancelled)

17. (Original) The system of claim 15, wherein said oven comprises a microwave oven.

18. (Original) The system of claim 15, further comprising a water supply conduit for supplying said quantity of water to said vessel.

19. (Previously Amended) The system of 18, further comprising:

a valve disposed in said water supply conduit; and

wherein said controller controls said valve to admit only said quantity of water into said vessel, said quantity representing a volume of water sufficient to fill said vessel to a desired level.

20. (Original) The system of claim 15, further comprising a water drain conduit for draining water from said vessel.

21. (Original) The system of claim 20, further comprising a valve disposed in said water drain conduit for controlling a draining of water from said vessel.

22. (Cancelled)

23. (Original) The system of claim 15, further comprising a water overflow conduit in communication with said vessel for draining water that rises above a predetermined level in said vessel, from said vessel.

24. (Original) The system of claim 15, further comprising a humidity sensor for sensing a level of humidity in said air flowing in said airflow conduit.

25. (Original) The system of claim 15, further comprising a water level sensor for sensing a level of water in said vessel.

26. (Original) The system of claim 15, further comprising a vacuum accumulator in communication with said vessel for assisting in draining said water from said vessel after said water has been heated for a predetermined time.

27. (Original) The system of claim 15, wherein said vapor injection system comprises:

a vapor outflow conduit in communication with said vessel; and

a plurality of vanes disposed in a path of said air flowing through said airflow conduit to cause a swirling of said air flowing in said airflow conduit to assist in dispersing said substantially micro-organism free steam into said air.

28. (Original) The system of claim 15, further comprising;

a pressure regulator valve for regulating a pressure of said steam entering said airflow conduit.

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

8-24-05

AF/3742

PTO/SB/21 (04-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/678,905
Filing Date	October 3, 2003
First Named Inventor	Doh et al.
Art Unit	3742
Examiner Name	Shawntina T. Fuqua
Total Number of Pages in This Submission	
Attorney Docket Number	7784-000657

ENCLOSURES *(check all that apply)*

- ☒ Fee Transmittal Form
  - ☒ Fee Attached
- ☐ Amendment / Reply
  - ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) ____
- ☐ After Allowance Communication to Technology Center (TC)
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) *(please identify below)*:
  postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Harness, Dickey & Pierce, P.L.C.	Attorney Name Mark D. Elchuk	Reg. No. 33,686
Signature	Mark D Elchuk		
Date	August 23, 2005		

CERTIFICATE OF TRANSMISSION/MAILING

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PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL for FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500

Complete if Known	
Application Number	10/678,905
Filing Date	October 3, 2003
First Named Inventor	Doh et al.
Examiner Name	Shawntina T. Fuqua
Art Unit	3742
Attorney Docket No.	7784-000657

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify) : _____

☒ Deposit Account Deposit Account Number: 08-0750 Deposit Account Name: Harness, Dickey & Pierce, P.L.C.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) Under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee($)	Fee($)	Fee($)	Fee($)	Fee($)	Fees Paid ($)
Utility	300	150	500	250	200	100	____
Design	200	100	100	50	130	65	____
Plant	200	100	300	150	160	80	____
Reissue	300	150	500	250	600	300	____
Provisional	200	100	0	0	0	0	____

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee($)	Fee Paid ($)
____ -20 or HP=	0	x ____	= 0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee($)	Fee Paid ($)
____ - 3 or HP=	0	x ____	= 0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
____	____

3. APPLICATION SIZE FEE

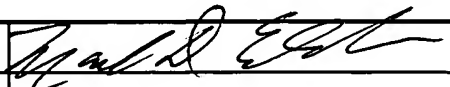
If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
____ -	= 0	/ 50 = 0 (round **up** to a whole number) x		= 0

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	____
Other (e.g., late filing surcharge) : #1402 - Appeal Brief	500

SUBMITTED BY

Signature		Registration No. (Attorney/Agent)	33,686	Telephone	(248) 641-1600
Name (Print/Type)	Mark D. Elchuk			Date	August 23, 2005